

1 **WHAT IS CLAIMED IS:**

2 1. A continuous process for the the partial oxidation of a high viscosity hydrocarbon
3 feedstream comprising:

4 (1) passing a stream of water through the central conduit of a four-stream
5 feed injector mounted in the upper portion of a gasifier, said feed
6 injector comprising radially spaced concentric central, second, third,
7 and outer cylindrical conduits, and said conduits being open at their
8 downstream exit orifices for discharge;

9 (2) simultaneously passing a high viscosity hydrocarbon feedstream
10 through the third cylindrical conduit;

11 (3) simultaneously passing a stream of free-oxygen containing gas,
12 optionally in admixture with a temperature moderator, through the
13 second and outer cylindrical conduits;

14 (4) mixing said streams from (1), (2) and (3) together prior to, at, or
15 downstream from the outer conduit exit orifice; and

16 (5) reacting the mixture from (4) in the reaction zone of the gasifier.

17 2. The process of claim 1 wherein the water is recycled gasification system water
18 containing carbon soot from the gasifier.

19 3. The process of claim 2 wherein the velocity of the water in the feed injector is about
20 1.0-120 feet per second.

21 4. The process of claim 1 wherein the high viscosity hydrocarbon feedstock is selected
22 from the group consisting of virgin crude, residua from petroleum distillation and
23 cracking, petroleum distillate, reduced crude, whole crude, asphalt, coal tar, coal
24 derived oil, shale oil, tar sand oil, solvent deasphalting bottoms, and mixtures thereof.

25 5. The process of claim 4 wherein the high viscosity hydrocarbon feedstock has a
26 viscosity of about 600 centipoise or greater at a temperature of 480°F (249°C).

27 6. The process of claim 4 wherein the high viscosity hydrocarbon feedstock is fed to the
28 gasifier at a temperature between about 550°F (288°C) and 600°F (316°C).

29 7. The process of claim 4 wherein the velocity of the high viscosity hydrocarbon
30 feedstock in the feed injector is about 10 to 120 feet per second.

- 1 8. The process of claim 7 wherein the velocity of the high viscosity hydrocarbon
2 feedstock is about 25-75 feet per second.
- 3 9. The process of claim 1 wherein the free-oxygen containing gas is selected from the
4 group consisting of air, enriched air, and nearly pure oxygen.
- 5 10. The process of claim 9 wherein the temperature moderator is either steam, water or an
6 inert gas.
- 7 11. The process of claim 9 wherein the velocity of the oxygen containing gas passing
8 through the first and outer annular passages is in the range of about 50 feet per second
9 to sonic velocity.
- 10 12. The process of claim 11 wherein the velocity of the oxygen containing gas passing
11 through the first and outer annular passages is in the range of about 150-750 feet per
12 second.
- 13 13. The process of claim 1 wherein the conditions in the reaction zone of the gasifier are
14 at a temperature between about 1,700°F (930°C) and about 3,000°F (1650°C), and a
15 pressure between about 1 atmosphere (100 KPa) and about 250 atmospheres (25,000
16 KPa).
- 17 14. The process of claim 13 wherein the temperature of the gasifier is between about
18 2,000° F (1100°C) and about 2,800° F (1540°C).
- 19 15. The process of claim 13 wherein the pressure of the gasifier is between about about
20 15 atmospheres (1500 Kpa) and about 150 atmospheres (1500 KPa).
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